

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections of record are respectfully requested.

Discussion Of Telephone Interview With the Examiner

Applicants express appreciation for the courtesies extended by the Examiner to Applicants' representative during an August 23, 2005 telephone interview. During the interview, amendments to the claims as presented herein were discussed with the Examiner. Moreover, the arguments of record concerning the deficiencies of the documents utilized in the rejections were discussed. The Examiner indicated that she will consider the amendment and remarks when submitted in writing. Accordingly, the amendments and arguments as discussed during the telephone interview are included in the amendments and remarks presented herein.

Summary of Status of Amendments

In the present amendment, claims 3-5 are canceled without prejudice or disclaimer of the subject matter recited therein, and claim 1 is amended. In particular, claim 1 has been amended as discussed with the Examiner during the above-noted interview to recite, amongst other features, a reaction section structured and arranged to perform transesterification under pressure with the pressure being reduced during transesterification, said reactor section comprising a static mixer comprising a pipe filled with balls to enlarge boundary surfaces of a mixture being transesterified in said reaction

section, and said reaction section is connected to the at least one container and the mixing vessel through a high pressure pump capable of achieving a pressure of 200 bar for introducing the fats and the alkaline solution to the reaction section.

Support for the amendment to the claims appears in Applicants' originally filed application, including page 3, lines 16-24; page 4, line 21 to page 5, line 2; page 7, lines 22-26; and page 12, lines 18-26, and canceled claims 3 and 4.

Information Disclosure Statements

Applicants request that the Examiner forward an initialed copy of the Form PTO-1449 submitted with the Information Disclosure Statement filed December 18, 2001 with the next communication from the Patent and Trademark Office.

Moreover, Applicants are submitting concurrently herewith a Second Supplemental Information Disclosure Statement. The Examiner is requested to consider this Second Supplemental Information Disclosure Statement and to also forward an initialed copy of the Form PTO-1449 submitted therewith.

Response To Rejection Under 35 U.S.C. 112, Second Paragraph

In response to the rejection of claims 1, 3, 4, 5, 13-32 and 35 under 35 U.S.C. 112, second paragraph, as being indefinite, Applicants respectfully submit the following.

In this ground of rejection, it is asserted that it is unclear as to the structural limitation applicant is attempting to recite and what is being referred to by the mixture.

In response and as discussed with the Examiner during the above-noted interview, the structure as recited in Applicants' claims is clearly and completely defined in the specification so that one having ordinary skill in the art would readily understand the scope of Applicants' claims. However, in order to advance prosecution of the application, claim 1 has been amended herein to even more clearly define Applicants' subject matter.

Accordingly, this ground of rejection should be withdrawn. However, as discussed with the Examiner, if the Examiner deems that any amendment would be beneficial to the claims, the Examiner is requested to contact the undersigned by telephone to discuss the same.

Response To Rejections Under 35 U.S.C. 103(a)

The following rejections are set forth in the Office Action:

(1) Claims 1, 3, 5, 25-32 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bam et al. (hereinafter "Bam"), U.S. Patent No. 5,424,467, in view of Assmann et al. (hereinafter "Assmann"), U.S. Patent No. 5,514,820, or Nouredдини, U.S. Patent No. 6,015,440.

(2) Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bam, U.S. Patent No. 5,424,467, in view of Assmann, U.S. Patent No. 5,514,820, or Nouredдини, U.S. Patent No. 6,015,440, and further in view of Borck et al. (hereinafter "Brock"), U.S. Patent No. 2,583,206.

(3) Claims 13 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bam, U.S. Patent No. 5,424,467, in view of Assmann, U.S. Patent No. 5,514,820, or Nouredini, U.S. Patent No. 6,015,440, and further in view of Kiehtreiber, EP 0 535 290.

(4) Claims 14-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bam, U.S. Patent No. 5,424,467, in view of Assmann, U.S. Patent No. 5,514,820, or Nouredini, U.S. Patent No. 6,015,440, and further in view of Kiehtreiber, EP 0 535 290, and further in view of Muraldihara et al. (hereinafter "Muraldihara"), U.S. Patent No. 5,482,633.

In response, Applicants respectfully submit the following.

Initially, Applicants note that for the sake of brevity, the arguments as previously presented by Applicants are not being repeated in their entirety herein. Applicants are stressing those arguments as presented during the interview. However, Applicants are incorporating their previous arguments herein as if set forth in their entirety.

Applicants' independent claim 1 is directed to an apparatus for producing fatty acid methyl ester, comprising at least one container for fats; a tank for alkaline solution; a tank for alcohol; a mixing vessel for compounding the alkaline solution and the alcohol; a reaction section structured and arranged to perform transesterification under pressure with the pressure being reduced during transesterification, said reactor section comprising a static mixer comprising a pipe filled with balls to enlarge boundary surfaces of a mixture being transesterified in said reaction section, and said reaction section is connected to the at least one container and the mixing vessel through a high pressure

pump capable of achieving a pressure of 200 bar for introducing the fats and the alkaline solution to the reaction section; and a separation unit downstream from the reaction section.

The documents of record do not teach or suggest Applicants' apparatus whether taken alone or in combination.

Applicants once again note that the rejections contend that Bam discloses a reaction vessel 22 with moving impeller 44. A review of these portions of the apparatus disclosed in Bam reveals, at column 6, beginning at line 33 that, "The transesterification reaction between the alcohol and vegetable oil is carried out in transesterification reaction vessel 22. To provide sufficient contact between the vegetable oil and the alcohol for the transesterification reaction to proceed, reaction vessel 22 includes an impeller 44 attached to motor 46. Motor 46 rotates impeller 44 so that it will agitate the reactor volume with just a slight amount of splashing." (Emphasis added.)

Also, at column 7, beginning at line 11, Bam discloses that, "Vegetable oil and alcohol are introduced into the reaction vessel 22 from alcohol storage tank 20 and oil storage tank 24 that can be provided with pumps or be gravity feed tanks."

Still further, a review of the drawings of Bam, reveals that reaction vessel 22 is an open mixing vessel and there is therefore no pressure. The reaction vessel of Bam is open and is not designed to be under pressure.

Thus, as previously argued by Applicants, Bam is directed to a reaction section which comprises an open mixing vessel that is not designed to be under pressure, and includes a stirrer in which the stirrer is rotated so as not to splash the liquid. Smooth

stirring is desired in Bam! Thus, Bam does not teach or suggest each and every feature recited in Applicants' claims for at least this reason.

Moreover, while Bam can include pumps, there is no disclosure of a high pressure pump in Bam that connects the reaction vessel 22 with the oil storage tank 24 and the mixing vessel wherein the alcohol and catalyst of Bam are mixed.

Bam only shows in Fig. 1 a pump in the line to the alcohol storage tank 20, and gravity feeds from the mixing vessel to the reaction vessel 22 and from the oil storage tank 24 to the reaction vessel 22. Thus, Bam does not teach or suggest each and every feature recited in Applicants' claims for at least this reason.

The rejection merely indicates that the pump is not shown, and then makes naked assertions about a pump, **but does not include in any supporting documentation**, as required, to support these assertions.

In particular, the rejections contend that the pump in the apparatus of Bam meets the claims since the specific pressure at which the pump operates is merely a matter of intended use, and it is well known in the art that pumps are inherently capable of feeding reactants over a wide range of pressures, including the instantly recited pressures, by performing a simple calibration of the pump.

During the above-noted interview, language regarding the pump was discussed and the Examiner agreed to the amendment of claim 1 to recite, "a high pressure pump capable of achieving a pressure of 200 bar". The Examiner appeared to agree that such

a pump would distinguish over a low pressure pump that would not be capable of achieving a pressure of 200 bar.

Thus, the rejections must establish by documentary evidence and must show that there is motivation in the prior art to modify the apparatus of Bam to provide a combination of elements which includes, amongst other features, a reaction section structured and arranged to perform transesterification under pressure with the pressure being reduced during transesterification, said reactor section comprising a static mixer comprising a pipe filled with balls to enlarge boundary surfaces of a mixture being transesterified in said reaction section, and said reaction section is connected to the at least one container and the mixing vessel through a high pressure pump capable of achieving a pressure of 200 bar for introducing the fats and the alkaline solution to the reaction section.

Still further, the rejections once again recognize that Bam does not disclose a static mixer. However, the rejections try to overcome this further deficiency in Bam by relying upon the disclosures of Assmann or Nouredini to substitute for the reaction section 22 of Bam.

Assmann shows that the reaction mixture flows through a tube reactor, whereby the flow ratio in the tube is chosen such that the Reynolds number is larger than 2,300, preferably slightly above 10,000, according to the formula for the Reynolds number (total density x flow velocity x inner tube diameter / mixture viscosity).

As indicated in the specification and drawing of Assmann, this tube reactor is a simple tube, in which the desired Reynolds number is set to between 2,300 and 10,000

by accordingly choosing the diameter and the flow velocity (the total density and the mixture viscosity being constants). The hydraulic pressures occurring hereby amount to 2-10 bar at the beginning of the tube, which pressures incidentally correspond to a low-pressure transesterification, with retention periods of 1-10 minutes, with a corresponding unavoidable loss of pressure of approximately 1 bar over the tube length.

In this context, it is noted that the Reynolds number is a dimensionless flow number, whereby for a round tube a Reynolds number of below 2,320 shows a laminar flow.

In contrast, the reaction section according to Applicants' invention is a static mixer comprising a pipe filled with balls, and is not a simple tube. The formula for the Reynolds number is not applicable to a reaction section according to the invention, or the Reynolds number cannot be calculated over the length of the reaction section.

Applicants submit that one having ordinary skill in the art would not have combined the disclosures of Bam and Assmann, because Bam is directed to an open reactor that is stirred to only provide slight splashing and Assmann is directed to a tube reactor. One having ordinary skill in the art, absent Applicants' disclosure, would not seek to combine such diverse disclosure. However, even if for the sake of argument the disclosures were combined, the above-noted deficiencies of Bam would not be overcome. One having ordinary skill in the art would not structure or arrange the reaction vessel 22 of Bam to be a static mixer as a pipe filled with balls as recited in Applicants' claims. Moreover, even if Bam and Assmann were combined, the mixer 2 of Assmann would be at most be

substituted for the mixing vessel of Bam and not the reaction vessel 22, and would not be filled with balls.

The static mixer of Nouredдини serves merely to premix the reaction components. As described, the operation takes place at 70-80°C and the vapor pressure of 1-2 bar corresponding to this temperature, whereby this is the vapor pressure of methanol at 80°C and not a hydraulic pressure. As with Assmann, one having ordinary skill in the art would not have combined the disclosures of Bam and Nouredдини. However, even if for the sake of argument the disclosures were combined, the above-noted deficiencies of Bam would not be overcome as discussed above with respect to Assmann. Moreover, one having ordinary skill in the art would not have modified the reaction vessel 22 of Bam with the reaction tube of Nouredдини. In any event, even if the substitution were made, the mixer of Nouredдини would be at most substituted for the mixing vessel of Bam and not the reaction vessel 22.

Moreover, as discussed with the Examiner during the above-noted interview, one having ordinary skill in the art would not modify the heat exchanger/reactor unit illustrated in Fig. 2c of Nouredдини any pipe of Assmann to include balls therein. The rejection does not address why any reactor would include balls therein.

As discussed with the Examiner during the above-noted interview, Borck merely discloses an apparatus for homogenizing. One having ordinary skill in the art would not have combined the disclosures of Bam and Assmann or Nouredдини with Borck. However, even if for the sake of argument the disclosures were combined, the above-noted deficiencies of Bam would not be overcome as one having ordinary skill in the art would

not modify Bam to include a reaction section structured and arranged to perform transesterification under pressure with the pressure being reduced during transesterification, said reactor section comprising a static mixer comprising a pipe filled with balls to enlarge boundary surfaces of a mixture being transesterified in said reaction section, and said reaction section is connected to the at least one container and the mixing vessel through a high pressure pump capable of achieving a pressure of 200 bar for introducing the fats and the alkaline solution to the reaction section.

Still further, whether or not it would have been obvious combine the disclosures of Kiehtreiber and Muraldihara with Bam and Assmann or Nouredini, no combination of these documents would arrive at Applicants' disclosed and claimed invention for the reasons set forth above.

Thus, Applicants respectfully once again submit that the only teaching or suggestion that would lead one having ordinary skill in the art to arrive at Applicants' invention is within Applicants' disclosure, and the use of such disclosure by the Examiner is improper. In order to support the conclusion that the claimed invention is either anticipated or rendered obvious over the prior art, the prior art must either expressly or inherently teach the claimed invention or the Examiner must present a convincing line of reasoning why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. Ex parte Clapp, 227 U.S.P.Q. 972 (B.O.A. 1985).

Additionally, each of the dependent claims is patentable over the prior art of record in view of the fact that each of these dependent claims includes the limitations of

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independent claim 1. Moreover, each of the dependent claims is patentable over the prior art of record because it would not have been obvious to one having ordinary skill in the art to incorporate such dependent claim features into the invention as more broadly recited in independent claim 1.

Accordingly, the rejections should be withdrawn as improper, and all of the claims should be indicated as allowable over the prior art of record.

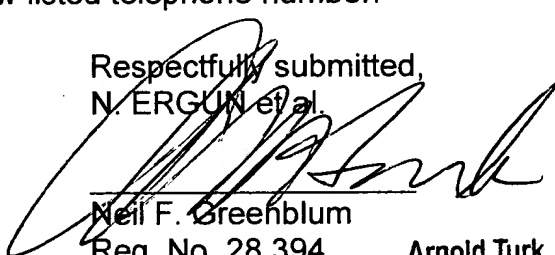
CONCLUSION

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the objections and rejections of record, and allow each of the pending claims.

Applicants therefore respectfully request that an early indication of allowance of the application be indicated by the mailing of the Notices of Allowance and Allowability.

Should the Examiner have any questions regarding this application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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